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U. S. DEPARTMENT OF AGRICULTURE

FEDERAL - STATE - PRIVATE

COOPERATIVE

SNOW SURVEY and WATER SUPPLY FORECASTS for COLORADO and NEW MEXICO

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE
and
COLORADO AGRICULTURAL EXPERIMENT STATION,
STATE ENGINEER of COLORADO
and STATE ENGINEER of NEW MEXICO

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, National Park Service and other Federal, State, and private organizations.

AS OF
MAY 1, 1960

USDA SCS LINCOLN NEBR 1957

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
COLORADO AND STATE OF UTAH	MONTHLY (JAN.-MAY)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA AND STATES OF IDAHO AND ALASKA	MONTHLY (JAN.-MAY)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA	MONTHLY (FEB.-MAY)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1, APR. 1, MAY 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ARIZONA	SEMI-MONTHLY (JAN. 15 - APR. 1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOCIATION ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
NEVADA	MONTHLY (FEB.-APR.)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-MAY)	PORTLAND, OREGON	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-MAY)	SPOKANE, WASHINGTON	WASH. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

Copies of these various reports may be secured from: Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

REPORT	ISSUED	AGENCY
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIFORNIA DEPT. OF WATER RESOURCES, SACRAMENTO, CALIFORNIA

FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND WATER SUPPLY FORECASTS

for

COLORADO RIVER, PLATTE RIVER ARKANSAS RIVER AND RIO GRANDE DRAINAGE BASINS

Issued

May 1, 1960

Report Prepared By
Jack N. Washichek, Snow Survey Supervisor
and
Don W. McAndrew, Assistant Snow Survey Supervisor
Fort Collins, Colorado

United States Department of Agriculture
Soil Conservation Service
and
Colorado Agricultural Experiment Station
Fort Collins, Colorado
and
State Engineer of Colorado
Denver, Colorado
and
State Engineer of New Mexico
Santa Fe, New Mexico

Issued By

Kenneth W. Chalmers
State Conservationist
Soil Conservation Service

Sherman S. Wheeler, Director
Colorado Agricultural
Experiment Station

J. E. Whitten
State Engineer
State of Colorado

S. E. Reynolds
State Engineer
State of New Mexico

General Series Paper No. 725
Colorado Agricultural Experiment Station

WATER SUPPLY OUTLOOK
COLORADO, RIO GRANDE, PLATTE AND ARKANSAS DRAINAGE BASINS
May 1, 1960

SNOWFALL DURING THE MONTH OF APRIL WAS FAR BELOW NORMAL. STREAMFLOW FORECASTS ON ALMOST ALL RIVERS WILL BE REDUCED TO SOME EXTENT. STILL THE HIGHEST SNOWPACK IN THE STATE OF COLORADO IS ON THE RIO GRANDE, DOLORES AND ANIMAS WATERSHEDS. THE SNOWPACK ON THE RIO GRANDE IN COLORADO AND NEW MEXICO SHOULD STILL PRODUCE A NORMAL RUNOFF, BUT PROSPECTS FOR MUCH HIGH WATER ARE POOR. THERE SHOULD BE NO SEVERE WATER SHORTAGES IN THE TWO STATES, BUT MANY AREAS WILL HAVE SOME SHORTAGE.

COLORADO. The northern half of the state still has the lowest snowpack. Snowfall during the month of April was much below normal. The Yampa and White watersheds have slightly more snow than last year, but are still only about 75% of 15 year average (1943-57). The drainage area of the South Platte and its downstream tributaries has only 80% of normal snowpack. Water shortages can occur in the entire northern half of the state.

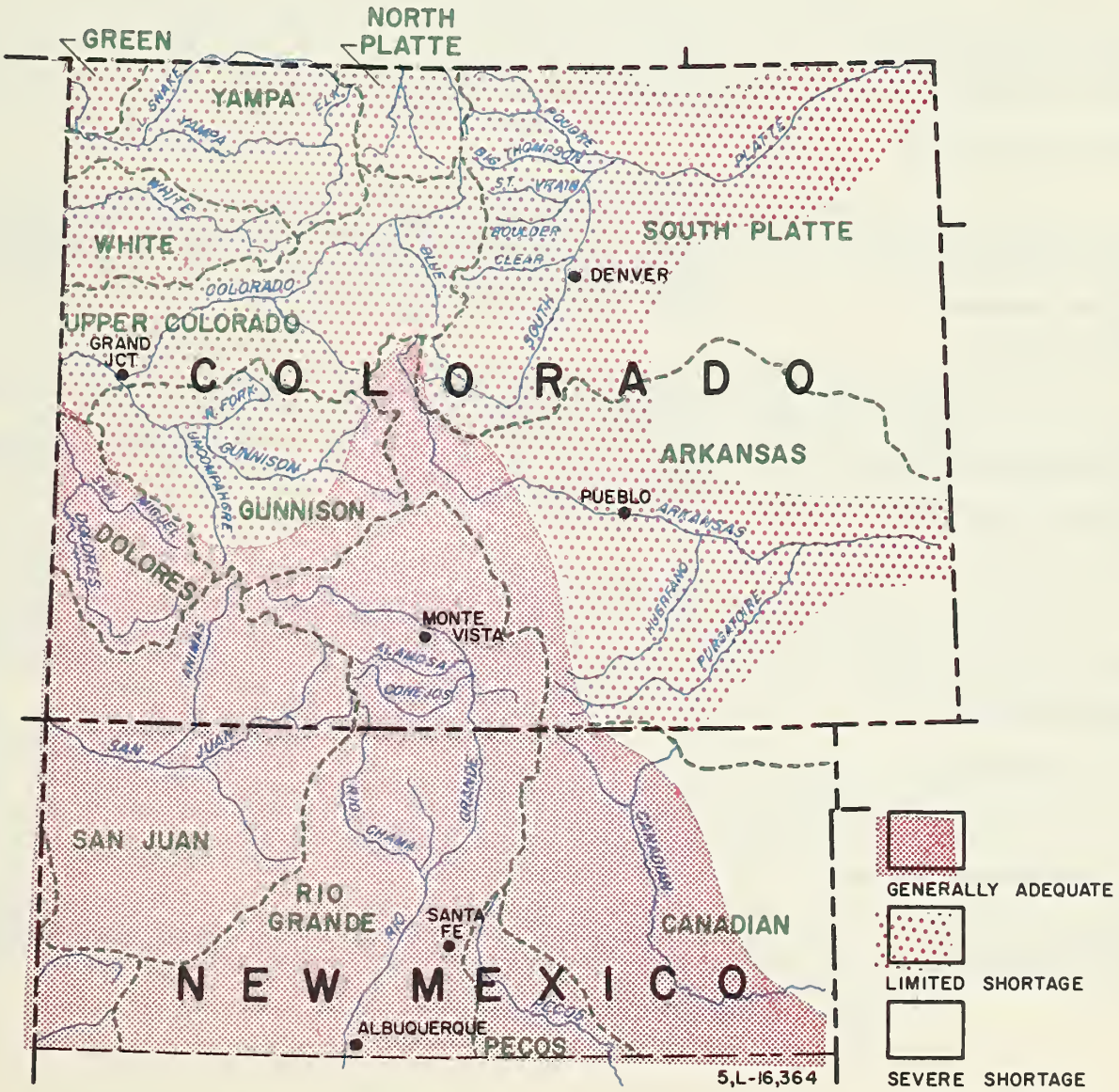
Water supply outlook in the southern half of the state is good in all areas except Arkansas, Culebre and Purgatoire Rivers. The snow pack in these areas is only about 80% of normal. Reservoir storage is deficient on the Arkansas and some water shortage could exist. The Rio Grande, Animas, Dolores and San Juan watersheds should have adequate water to meet irrigation demands. All areas report good soil conditions but warm winds are rapidly reducing surface moisture.

NEW MEXICO. Water supply outlook for New Mexico is not as good as last month. Snowfall was extremely deficient over most of the basins. High temperatures and no new snow has reduced the snowpack to below normal in some places. Low elevation snow is all gone, but high snow is still fairly good. Forecasts have generally gone down for the entire portion of the state that uses snow water for irrigation. Soil moisture is good. Streamflow is reported as normal or above. If spring and summer rainfall is normal or above, no severe shortages should exist.

WATER SUPPLY OUTLOOK

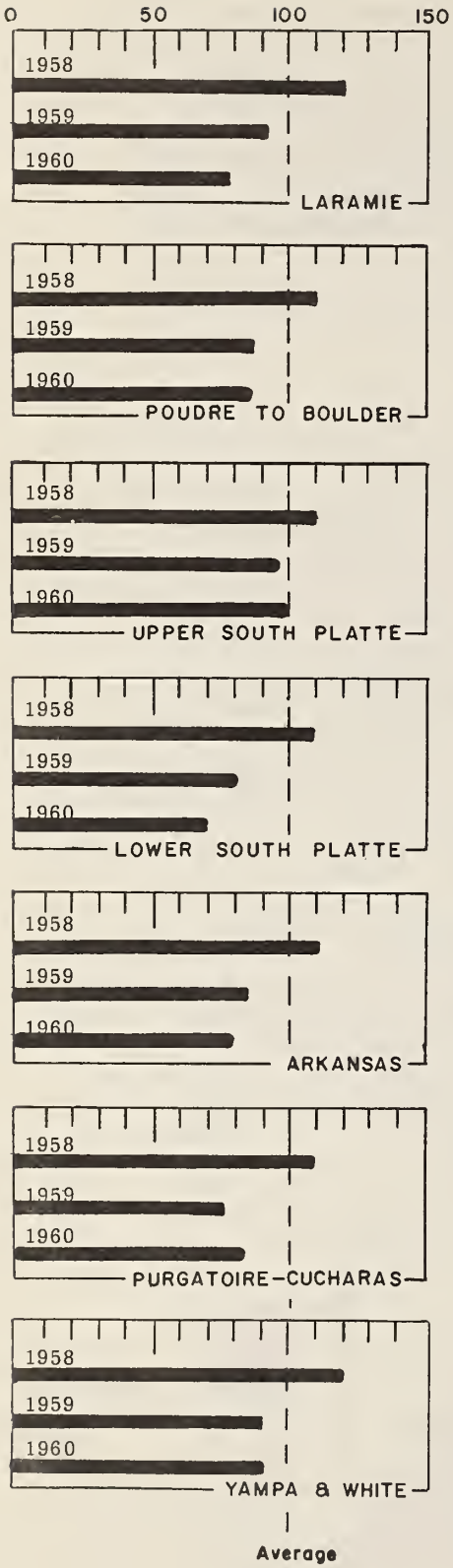
THE MAP ON THIS PAGE INDICATES THE MOST PROBABLE WATER SUPPLY AS OF THE DATE OF THIS REPORT. ESTIMATES ASSUME AVERAGE CONDITIONS OF SNOW FALL, PRECIPITATION AND OTHER FACTORS FROM THIS DATE TO THE END OF THE FORECAST PERIOD. AS THE SEASON PROGRESSES ACCURACY OF ESTIMATES IMPROVE. IN ADDITION TO EXPECTED STREAMFLOW, RESERVOIR STORAGE, SOIL MOISTURE IN IRRIGATED AREAS, AND OTHER FACTORS ARE CONSIDERED IN ESTIMATING WATER SUPPLY. ESTIMATES APPLY TO IRRIGATED AREAS ALONG THE MAIN STREAMS AND MAY NOT INDICATE CONDITIONS ON SMALL TRIBUTARIES.

May 1, 1960



USDA-SCS-LINCOLN NEBR 1959

WATER SUPPLY OUTLOOK



THE BAR CHARTS ON THIS AND THE NEXT PAGE REPRESENT GRAPHICALLY THE MOST PROBABLE WATER SUPPLY OUTLOOK FOR 1960 AS COMPARED TO 1958 AND 1959. STREAMFLOW AND OTHER FACTORS FOR 1959 ARE PARTIALLY ESTIMATED AS FULL DATA ON WATER SUPPLY CONDITIONS ARE NOT YET AVAILABLE. ESTIMATES OF PAST CONDITIONS AND FORECASTS HAVE BEEN MADE BY THE AUTHORS OF THIS REPORT IN CONSULTATION WITH WATER OFFICIALS.

LARAMIE: Snowpack on the Laramie River Basin is only about 70% of normal. High elevation snows are still fairly good, but low elevation snows are almost gone. Snowfall during the month of April was deficient. Soil moisture is reported as excellent. Some late season shortages may exist.

POUDRE TO BOULDER. The warm weather experienced during the latter part of March and April, combined with the much below normal snowfall for April, has reduced the snowpack to about 75% of average. This area will experience some shortages of water this year, but due to above normal reservoir storage and excellent mountain soil moisture, the shortages should not be severe.

UPPER SOUTH PLATTE. High elevation snowpacks are above normal, but the lower elevation snows are greatly depleted, due to the warm temperatures and deficient snowfall during April. Storage in irrigation reservoirs and the municipal reservoirs of the City of Denver are above average. Soil moisture conditions are good. A near normal water supply this year is anticipated.

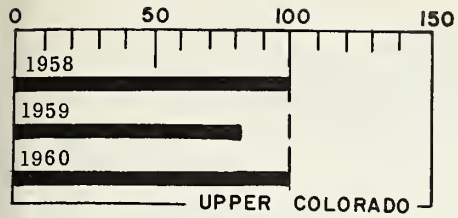
LOWER SOUTH PLATTE. Storage in irrigation reservoirs is near capacity and slightly above last year at this time. Soil moisture conditions are reported as excellent in the area. Because of less than normal streamflow and heavy upstream usage, limited shortages will exist.

ARKANSAS. Streamflow on the Arkansas should be about normal and similar to last year. An adequate water supply is anticipated for the area above Pueblo. Irrigated lands below Pueblo could experience some shortage due to poor carryover storage. Soil moisture in the upper basin is nearly saturated. Valley soil moisture is reported as good which will tend to offset water shortages.

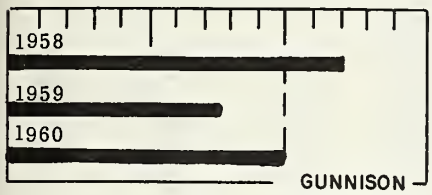
PURGATOIRE-CUCHARAS. April snowfall was much below normal on these watersheds. High temperatures and winds have also reduced the mountain snowpack. Water shortages in these areas will exist unless the summer rainfall is high.

YAMPA-WHITE. Water supply for this season should be adequate to meet the limited demands. No excessive streamflows are anticipated. Soil moisture conditions in mountain and valley areas are excellent.

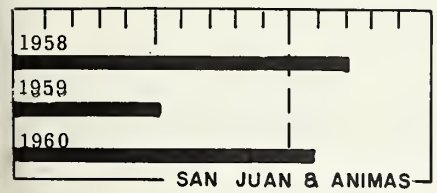
WATER SUPPLY OUTLOOK



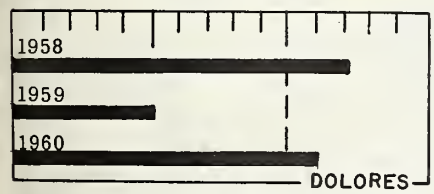
UPPER COLORADO. The streamflow for this area should be near normal this season. The snowpack as of May 1 is about 95% of normal. Soil moisture throughout the basin is reported as excellent. All indications point to a reasonably adequate water supply for the smaller irrigated areas along the main stem and the tributary streams.



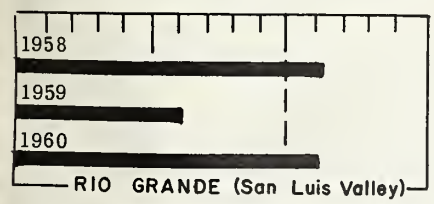
GUNNISON. The water supply outlook for the irrigated areas in this basin is normal or slightly above for the 1960 season. Summer streamflow should be near normal and similar to last year. Soil moisture in the mountains and valleys is excellent. The present streamflow is above normal.



SAN JUAN-ANIMAS. Heavy streamflow occurred from lower elevation snowmelt during the latter part of March and April. Snow ac cumulation during April was far below normal. Snow water content for all snow courses is still slightly above average but less than anticipated. Streamflow is expected to be slightly above normal and considerably above the 1959 season. Soil moisture throughout the area is good.



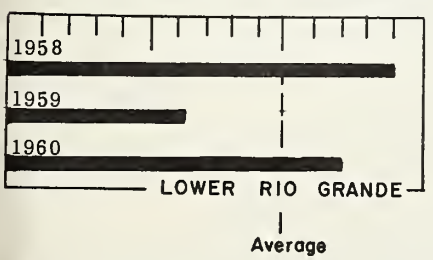
DOLORES. The summer flow of the Dolores River will be about 110% of normal, and greatly improved over the 1959 season. Mountain soil moisture is excellent. Snowpack is about average for the basin even though the lower elevation snows have melted.



RIO GRANDE (San Luis Valley). Runoff was high during April due to melt of the low elevation snowpack. Small reservoirs contain about 100% of normal carryover but less than that of last year. Mountain soil moisture is excellent. The flow of the Alamosa, Conejos, and main stream of the Rio Grande is now forecast at about 115 percent of normal. The valley should experience a very good water supply this season.



MIDDLE RIO GRANDE (New Mexico). The flow of the river through the Middle Rio Grande Valley is forecast at 135 percent of normal for the summer months. The flow of tributary streams in Northern New Mexico can be expected to have above seasonal average flows. Soil moisture at high elevations is excellent and reported as good in the irrigated areas. Heavy streamflow has already occurred, as the result of lower elevation snowmelt during April.



LOWER RIO GRANDE. Storage in Elephant Butte and Caballo Reservoirs is slightly above normal but still below that of last year. Flow of the Lower Rio Grande during the summer months should be sufficient to meet most irrigation demands. Soil moisture conditions are relatively good in most areas.

FOR DETAILS ON WATER SUPPLY CONDITIONS ON THE COLORADO RIVER DRAINAGE IN UTAH AND ARIZONA, NOT LISTED OR DISCUSSED IN THIS REPORT, REFERENCE SHOULD BE MADE TO THE STATE SNOW REPORTS FOR UTAH (see inside cover).

STREAMFLOW FORECASTS

APRIL-SEPTEMBER INCLUSIVE*

May 1, 1960

"The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature during the forecast period will be near average. Appreciable deviations from normal of temperature and/or precipitation during the forecast period will correspondingly modify these forecasts."

BASIN AND STREAM	Forecast 1000 AF	% Avg. 1943-57	15-Yr. Avg. 1943-57
NORTH PLATTE			
Laramie at Jelm	70	62	113
SOUTH PLATTE			
Cache la Poudre at Canon(1)	160	85	189
Big Thompson at Drake	72	78	93
Saint Vrain at Lyons	67	80	84
Boulder at Orodell	50	91	55
Clear Creek at Golden (2)	140	102	137
ARKANSAS			
Arkansas at Salida (3)	330	97	339
Arkansas at Pueblo (3)	340	99	342
Cucharas at La Veta	11	78	14
Purgatoire at Trinidad	33	64	52
COLORADO			
Colorado nr Granby (4)	240	102	235
Willow nr Granby	38	86	44
Blue abv Green Mt. Res.	265	91	290
Colorado at Glenwood Spgs. (5)	1640	106	1546
Roaring Fork at Glenwood (6)	754	94	803
Plateau Creek at Collbran	49	86	57
Uncompahgre at Colona	160	110	145
Surface Cr. nr Cedaredge	16	89	18
Williams Fk nr Parshall	82	105	78

BASIN AND STREAM	Forecast 1000 AF	% Avg. 1943-57	15-Yr. Avg. 1943-57
COLORADO			
Gunnison at Gr. Junction	1400	101	1386
San Juan at Rosa, N.M.	675	115	587
Piedra at Piedra	170	91	186
Los Pinos nr Bayfield (7)	230	105	220
Florida nr Durango	62	100	62
Animas at Durango	520	109	475
La Plata at Hesperus	31	111	28
Dolores at Dolores	310	111	279
GREEN RIVER			
Little Snake at Lily	312	89	350
Elk at Clark	182	85	215
Yampa at Steamboat Spgs.	230	81	283
White at Meeker	270	81	335
RIO GRANDE			
South Fork at South Fork	138	114	121
Rio Grande at Del Norte (8)	625	127	491
Alamosa above Terrace Res.	80	113	71
Conejos at Mogote	230	117	197
Culebra at San Luis (9)	24	100	24
Rio Chama nr La Puente	225	107	210
Costilla at Costilla	25	93	27
Rio Grande at Otowi Bridge(10)	850	134	633
Rio Grande at San Marcial (10)	564	130	434
Pecos at Pecos	65	135	48

(1) Observed flow minus diversions from Michigan, Colorado and Laramie Rivers, plus diversions for irrigation and municipal use.

(2) Observed flow minus diversions through Jones Pass Tunnel.

(3) Observed flow plus change in storage in Clear Creek, Twin Lakes and Sugar Loaf Reservoirs minus diversions through Busk-Ivanhoe and Twin Lake Tunnels and Ewing, Fremont Pass, Wurtz and Columbine Ditches.

(4) Observed flow plus diversions by Adams tunnel and Grand River ditch plus change in storage in Granby Reservoir.

(5) Observed flow plus the changes as indicated in (4) plus Moffat Ditch.

(6) Observed flow plus diversion through Twin Lakes tunnel.

(7) Observed flow plus changes in Vallecito Reservoir.

(8) Observed flow plus change in storage in Santa Maria, Rio Grande, and Continental Reservoir.

(9) Observed flow plus changes in storage in Sanchez Reservoir.

(10) Observed flow plus changes in storage in Santa Maria, Rio Grande, Continental, Terrace, Sanchez, Platoro and El Vado Reservoirs.

* Rio Grande at Otowi and Rio Grande at San Marcial ave. Mar-July inclusive.

COOPERATIVE SNOW SURVEYS
SUMMARY OF SNOW MEASUREMENTS
May 1, 1960

WATERSHEDS	No. of Courses Averaged	Years of Record	Water Content as percent of 1959	Avg.
ARKANSAS RIVER				
Arkansas River	8	7-24	78	81
COLORADO RIVER				
Colorado River*	30	8-24	75	84
Roaring Fork	3	23-24	58	61
Plateau Creek	2	20-23	124	99
Yampa River	6	8-24	60	76
White River	2	24	67	73
Gunnison River	11	9-24	104	91
Dolores River	4	11-24	126	106
San Juan River	3	9-24	139	85
Animas River	8	9-24	124	95
PLATTE RIVER				
Laramie River	3	10-21	62	62
South Platte River**	2	20-24	60	76
Poudre River	7	11-24	69	77
Big Thompson River	4	9-22	83	86
St. Vrain River	3	10-24	48	46
Boulder Creek	2	8-21	46	67
Clear Creek	5	9-24	76	95
RIO GRANDE				
Rio Grande (Colo.)	9	9-24	135	98
Conejos River	3	11-24	84	39
Alamosa River	2	20-23	188	80

*Above Glenwood Springs

** Above Denver

AVAILABLE SOIL MOISTURE

DRAINAGE BASIN AND STATION	Date	SOIL MOISTURE CONTENT IN INCHES Cap.	1960	1959	1958	Avg.	Years of Record
NORTH PLATTE							
Muddy Pass	4/25	8.0	8.0	7.3	6.8	4.1	6
Willow Pass	4/26	7.0	6.7	2.1	7.0	3.8	6
SOUTH PLATTE							
Feather	4/21	6.0	6.0	1.6	3.2	3.2	8
Laramie Road	4/28	7.0	6.8	2.5	2.9	4.0	8
Beaver Dam	4/22	6.0	2.9	0.2	1.3	2.5	8
Two Mile	4/22	8.0	3.7	1.7	4.1	3.4	8
Guard Station	4/22	7.0	3.9	2.4	2.3	4.3	8
Alpine Camp	4/22	7.0	3.7	0.6	1.7	2.9	8
Hoop Creek	4/26	6.0	6.0	2.3	1.8	1.3	7
Alma	4/27	7.0	6.7	0.5	4.1	1.7	4
Kenosha Pass	4/27	7.0	6.2	6.4	6.6	4.8	4
Clear Creek	4/28	7.0	3.4	--	--	--	2
ARKANSAS							
Leadville	4/27	7.0	2.9	1.9	3.9	3.2	7
Lake Creek	4/28	6.0	5.8	4.2	5.2	4.9	4
Garfield	4/28	7.0	4.5	5.2	6.0	5.8	4
ROARING FORK							
Placita	4/28	8.0	7.8	5.1	7.5	6.6	4
Maroon	4/28	8.0	7.8	8.0	7.4	7.3	6
ELK RIVER							
Hahns Peak		--	--	--	--	--	--
DOLORES							
Lizzard Head	4/27	7.0	3.9	5.3	--	--	2
Dolores	4/27	7.0	4.2	2.8	--	--	2
Rico	4/27	7.0	3.5	4.7	--	--	2
UPPER COLORADO							
Vail	4/28	8.0	7.9	8.0	5.8	6.3	6
Ranch Creek	*	7.0	4.3	4.2	3.8	3.8	4
Hairpin	*	8.0	3.0	0.1	4.2	1.4	4
Vasquez Siphon	--	7.0	--	6.2	5.3	5.7	4
Gore	4/26	7.0	6.4	7.0	6.5	6.4	4
Blue River	4/27	7.0	3.9	1.4	5.9	2.5	4
SAN JUAN							
Mineral Creek	4/30	7.0	4.8	1.4*	6.5	--	3
Molas Lake	4/30	7.0	4.4	0.4*	6.7	--	3
Cascade	4/30	7.0	4.9	5.3*	6.7	--	3
GUNNISON							
King	4/28	8.0	5.4	6.3	7.1	6.3	3
RIO GRANDE (Colo)							
Bristol View	4/25	7.0	6.6	--	7.0	3.0	7
Alberta Park	4/27	9.0	7.0	4.6	6.7	5.2	7
Mogote	4/28	7.0	6.3	6.3	6.4	5.2	7
LaVeta Pass	4/26	8.0	7.8	5.7	7.3	6.9	4
RIO GRANDE (N.M.)							
Red Summit	*	4.8	0.2	0.2	3.6	0.8	6
Aqua Piedra	*	7.2	1.9	1.0	6.4	3.8	6
Bateman	*	6.7	1.0	1.0	7.7	4.5	4
Chamita	*	8.0	6.2	2.5	7.3	5.8	4
Fenton Hill	*	6.5	6.5	--	--	--	--
Big Tesuque	*	3.7	1.9	3.0	3.7	3.4	3
Rio En Medio	*	3.5	0.3	2.3	--	--	2
Taos Canyon	*	3.3	3.1	1.3	3.0	2.2	3

*April 1 readings

ALL PROFILE DEPTHS ARE 48 INCHES

STATUS OF RESERVOIR STORAGE

May 1, 1960

RESERVOIR	USABLE CAPACITY 1,000 A.F.	USABLE STORAGE 1000 A.F. 1960	1959	15-yr. Avg. 1943-57
SOUTH PLATTE DRAINAGE				
Windsor	18.6	13.4	15.6	11.4
Cache la Poudre	9.5	8.5	9.9	7.6
Fossil Creek	11.6	9.2	8.8	7.9
Terry Lake	8.2	6.3	5.5	5.0
Halligan	6.4	6.4	6.4	2.0
Chambers Lake	8.8	4.5	2.1	2.6
Cobb Lake	34.3	18.7	17.9	5.5
Black Hollow	8.0	3.8	5.0	3.4
Carter	108.9	81.3	83.0	69.2*
Horsetooth	143.5	119.1	117.5	94.0*
Lake Loveland	14.3	12.2	11.8	7.0
Boyd Lake	44.0	38.3	40.6	18.5
Lone Tree	9.2	8.5	8.8	8.4
Mariano	5.4	5.5	5.6	3.1
Union	12.7	12.0	--	7.2
Eleven Mile	81.9	97.8	97.8	69.4
Cheesman	79.0	79.1	67.4	52.7
Marston	18.9	15.8	16.9	15.1
Antero	33.0	15.7	15.7	14.9
Gross	43.1	18.7	12.7	-- *
Barr Lake	32.2	32.2	27.7	24.3
Milton	24.4	24.4	16.7	12.8
Standley	18.5	17.0	12.2	12.4
Marshall	10.3	8.5	5.5	3.5
Horse Creek	20.6	20.6	13.8	11.2
Riverside	57.5	57.5	57.5	50.4
Empire	37.7	34.4	33.6	29.5
Jackson Lake	35.4	34.7	34.3	34.3
Prewitt	32.8	29.1	29.1	21.5
Point of Rocks	70.0	69.3	70.3	61.7
Julesburg	28.2	22.7	22.2	22.1

*Shorter Periods

RESERVOIR	USABLE CAPACITY 1,000 A.F.	USABLE STORAGE 1000 A.F. 1960	1959	15-yr. Avg. 1943-57
ARKANSAS DRAINAGE				
Twin Lakes	57.9	10.7	14.3	19.3
Sugar Loaf	17.4	3.2	2.6	7.6
Clear Creek	11.4	8.2	5.1	4.3
Meredith	41.9		23.5	13.3
Horse Creek	26.9	0.0	2.6	7.4
Adobe Creek	61.6	0.0	27.9	21.2
Cucharas	40.0	1.2	5.8	4.4
John Martin	366.6	20.9	237.7	44.8
Great Plains	150.0	55.4	108.3	51.1
Model	15.0	5.0	5.0	2.3
Conchas (NM)	600.0	323.1	241.0	265.2
W. C. Austin	151.0	136.6	--	60.9
COLORADO DRAINAGE				
Taylor Park	106.2	61.3	51.1	67.0
Vallecito	126.3	50.6	51.4	64.3
Groundhog	21.7	7.5	6.1	9.2
Granby	465.5	236.3	231.7	185.3
Green Mountain	146.9	53.6	42.6	52.3
RIO GRANDE (COLO) DRAINAGE				
Rio Grande	45.8	13.6	8.8	11.7
Santa Maria	45.0	6.3	8.3	8.4
Sanchez	103.2	16.1	24.6	11.1
Terrace	17.7	11.5	3.8	3.5
Continental	26.7	7.9	5.6	8.9
Platoro	60.0	6.7	34.0	5.3*
RIO GRANDE (N. M.) DRAINAGE				
Elephant Butte	2,206.8	593.4	851.7	551.7
Caballo	344.0	116.2	172.6	130.3
El Vado	194.5	68.0	--	85.8*
Alamogordo	122.1	105.0	122.0	36.0
McMillan-Avalon	37.0	6.6	18.0	8.3
Red Bluff(Tex)	307.0	64.0	--	68.5*

VALLEY PRECIPITATION[1/]

Division Averages and Departures[3/]

DRAINAGE DIVISIONS	Fall Sept. - Oct. -Nov. Avg.	Dept.	Winter Dec. - Mar. Avg.	Dept.[2/]
South Platte River	6.28	∤1.90	2.75	∤.21
Arkansas River	7.33	∤2.44	3.46	∤.28
Colorado River	8.16	∤2.21	6.61	∤.69
San Juan River, N. M.	7.27	∤2.52	4.07	∤.49
Canadian River, N.M.	6.63	∤0.02	2.82	∤.08
Rio Grande, Colo.	7.43	∤3.70	2.42	∤.17
Rio Grande, (N.), N.M.	6.81	∤0.72	5.61	∤1.47
Rio Grande, (S), N.M.	5.52	∤1.32	2.22	∤.33
Pecos River, N.M.	5.21	∤0.29	3.66	∤.98

1/ Preliminary analysis by U.S. Weather Bureau from data furnished by Meteorological Service & U. S. Weather Bureau

2/ Departure from average

3/ Selected Stations

SNOW COURSE MEASUREMENTS

May 1, 1960

SNOW COURSE	Date	Depth 1960 Inches	Water Content In Inches 1960	1959	Avg.	Years of Record **
PLATTE RIVER DRAINAGE						
NO. PLATTE RIVER						
Cameron Pass	4/27	63	26.0	29.7	25.6	24
Park View	4/25	7	2.1	5.3	6.5	24
Columbine Lodge	4/25	42	13.7	28.1	21.3	24
Willow Cr. Pass*	4/25	24	7.6	9.9	11.5	22
Northgate	4/28	1	0.2	2.7	4.3	10
LARAMIE RIVER						
Roach	4/26	34	11.3	19.3	20.9	19
Deadman Hill*	4/27	37	15.5	18.6	17.7	21
McIntyre	4/27	13	3.3	10.8	9.9	10
POUDRE RIVER						
Cameron Pass	4/27	63	26.0	29.7	25.6	24
Chambers Lake	5/1	0	0	8.1	4.9	24
Big South	5/1	0	0	0.4	0.9	24
Deadman Hill	4/27	37	15.5	18.6	17.7	21
Lake Irene*	4/27	63	23.0	23.4	24.3	22
Hour Glass Lake	5/1	7	1.8	7.4	7.8	20
Red Feather	4/27	0	0.0	9.1	5.3	11
Lost Lake	5/1	16	5.5	14.2	9.6	9
BIG THOMPSON RIVER						
Lake Irene*	4/27	63	23.0	23.4	24.3	22
Hidden Valley	4/28	36	10.8	14.2	13.4	19
Deer Ridge	4/28	5	0.9	5.1	3.3	11
Longs Peak	4/30	44	11.9	13.9	13.6	9
Two-Mile	4/28	54	16.0	18.1	18.1	8
ST. VRAIN RIVER						
Wild Basin	4/27	24	9.6	14.4	15.2	24
Copeland Lake	4/27	0	0.0	0.5	3.2	11
Ward	4/28	6	1.7	8.6	6.3	10
BOULDER CREEK						
University Camp	4/27	49	17.1	31.6	25.1	21
Moffat	Abandon			15.5	9.0	10
Boulder Falls	4/27	22	8.2	22.9	12.8	9
CLEAR CREEK						
Loveland Pass	4/28	29	12.6	20.1	14.7	24
Grizzly Peak*	4.27	55	18.2	21.2	20.1	18
Empire	4/28	17	5.9	7.3	5.6	11
Berthoud Falls	4/28	25	8.8	19.1	12.8	9
Clear Creek	4/28	61	22.0	21.2	18.0	9
SOUTH PLATTE RIVER						
Hoosier Pass	4/27	36	11.4	15.6	11.9	24
Jefferson Cr	4/27	13	3.8	9.9	8.0	20
Geneva Park	5/2	3	1.1	3.6	1.8	11

SNOW COURSE	Date	Depth 1960 Inches	Water Content In Inches 1960	1959	Avg.	Years of Record **
ARKANSAS RIVER DRAINAGE						
ARKANSAS RIVER						
Tennessee Pass	4/28	16	6.2	11.9	6.8	24
Twin Lakes T.	4/29	22	7.8	8.3	9.2	23
La Veta Pass*	4/26	0	0.0	0.8	2.8	24
4 Mile Park	4/28	0	0.0	1.4	0.7	22
Fremont Pass	4/27	57	19.2	17.7	18.6	24
Monarch Pass	4/28	31	13.1	18.2	17.7	19
Saint Elmo (a)		NS		10.2	10.3	10
Timberline		NS		18.8	19.9	11
East Fork	4/27	18	6.5	10.0	8.9	8
Westcliffe	4/29	8	0.5	0.0	1.4	7
Bourbon	4/26	0	0.0	0.0	--	4
Cooper Hill	4/28	49	16.3	--	--	0
COLORADO RIVER DRAINAGE						
COLORADO RIVER (Above Glenwood Springs)						
Cameron Pass*	4/27	63	26.0	29.7	25.6	24
Phantom Valley	4/28	10	2.8	5.5	6.6	24
Hoosier Pass*	4/27	36	11.4	15.8	11.9	24
Berthoud Pass	4/26	35	13.1	18.1	14.3	24
Tennessee Pass	4/28	16	6.2	11.9	6.8	24
M. Fork Camp Gr.	4/26	6	2.2	8.2	6.0	24
Fiddler Gulch	4/28	43	15.3	19.5	15.9	22
Lulu	4/26	52	18.2	19.1	19.0	20
Willow Creek P.	4/25	24	7.6	9.9	11.5	22
N. Inlet Grand L.	4/26	10	3.3	6.7	7.0	22
Lake Irene	4/27	63	23.0	23.4	24.3	22
Arrow	4/26	23	8.2	12.2	7.8	20
Lapland	4/28	9	3.3	10.3	9.1	22
Fremont Pass	4/27	57	19.2	17.7	18.6	24
Lynx Pass	4/26	8	2.8	10.0	7.5	24
Shrine Pass	4/28	53	20.5	21.5	18.7	18
Grizzly Peak	4/27	55	18.2	21.2	20.1	18
Glen-Mar Ranch	4/26	0	0.0	6.6	4.5	13
Monarch Lake	4/26	15	4.9	6.5	6.0	12
Granby	4/26	0	0.0	5.0	3.5	11
Grand Lake	4/28	4	1.3	3.1	3.8	11
Berthoud Summit	4/28	62	21.7	23.6	19.9	9
Frazer View	4/28	30	11.7	15.1	11.7	9
Gore Pass	4/26	6	1.9	9.9	7.7	9
Frisco	4/27	2	0.9	7.0	5.7	9
Snake River	4/27	0	0.0	6.1	5.7	9
Summit Ranch	4/26	3	0.9	6.5	6.1	9
Vail Pass	4/28	26	10.8	15.7	17.7	8
Pando	4/28	10	5.0	10.5	9.1	8
Kokomo	4/27	35	14.0	11.5	11.3	8
Milner	4/27	30	10.2	12.4	12.5	8
Blue River	4/27	8	2.3	10.9	--	3
Jones Pass	4/27	38	13.5	17.0	--	3
Ranch Creek	4/26	20	6.8	10.5	--	3
Vasquez Creek	4/26	30	10.9	15.6	--	3
Cooper Hill*	4/28	49	16.3	--	--	0
ROARING FORK						
Ind. Pass Tunnel	4/29	44	15.4	18.3	17.8	24
North Lost Trail	4/28	1	0.4	9.7	8.8	24
Nast	4/28	6	1.4	1.6	1.6	23
Ivanhoe				NS	18.5	14
Lift	4/26	35	10.8	--	--	1
Aspen	4/26	53	16.3		--	0

* On adjacent drainage

** Courses with less than 15 years record in period 1943-57 have all years prior to 1957 averaged.

NS No Survey

(a) Air observed

SNOW COURSE MEASUREMENTS

May 1, 1960

SNOW COURSE	Date	Depth 1960 Inches	Water Content In Inches 1960	1959	Avg.	Years of Record **
YAMPA RIVER						
Dry Lake	4/27	20	9.6	20.7	15.2	24
Columbine Lodge*	4/25	42	13.7	28.1	21.3	24
Elk River	4/28	24	8.8	16.8	12.8	24
Lynx Pass*	4/26	8	2.8	10.0	7.5	24
Rabbit Ears	4/28	64	28.0	NS	26.1	8
Yampa View	4/27	15	6.1	15.1	8.0	9
Bear River	4/27	3	1.2	10.9	--	4
Clark	4/28	0	0.0	4.7	--	4
WHITE RIVER						
Burro Mountain	4/27	41	17.0	17.0	14.6	24
Rio Blanco	4/27	2	1.0	9.7	10.2	24
PLATEAU CREEK						
Mesa Lakes	4/26	38	16.4	14.1	14.4	23
Trickle Divide	est	69	27.0	21.0	29.4	20
GUNNISON RIVER						
Crested Butte	4/27	0	0.0	8.8	7.9	24
Park Cone	4/27	22	7.9	6.1	7.4	23
Alexander Lake	4/30	53	22.5	14.1	22.7	23
Ironton Park	4.29	24	8.7	11.6	7.0	23
Trickle Divide	est	69	27.0	21.0	29.4	20
Park Reservoir	est	61	23.7	18.5	25.5	20
Porphyry Creek	4/28	41	15.6	17.7	16.7	20
Lake City	4/28	11	3.4	3.2	3.5	12
Cochetopa Pass*	4/28	0	0.0	0.0	2.3	11
McClure Pass	4/28	9	4.2	9.8	9.6	10
Red Mt. Pass	4.27	86	33.5	30.7	29.8	9
Blue Mesa	4/29	1	.4	.4	--	2
SAN JUAN RIVER						
Wolf Creek Pass*	4/27	42	20.1	15.9	25.4	24
Upper San Juan	4/27	47	19.8	18.3	30.3	24
Wolf Creek Summit	4/27	84	34.5	19.4	31.9	9
ANIMAS RIVER						
Silverton Sub. S.	4/27	0	0.0	0.0	0.5	22
Ironton Park*	4/29	24	8.7	11.6	7.0	23
Cascade	4/27	11	3.0	0.0	2.9	24
Spud Mt.	4/27	60	20.8	13.4	25.8	9
Molas Lake	4/27	14	5.0	1.5	10.5	9
Howardville	4/27	30	9.9	6.2	6.3	9
Mineral Creek	4/27	35	12.1	11.4	14.7	9
Red Mt. Pass*	4/27	86	33.5	30.7	29.8	9
DOLORES RIVER						
Rico	4/28	0	0.0	0.0	1.3	23
Telluride	4/28	0	0.0	0.0	1.2	24
Lizard Head	4/27	30	14.3	11.8	12.9	23
Trout Lake	4/28	29	12.2	9.3	9.6	11

SNOW COURSE	Date	Depth 1960 Inches	Water Content In Inches 1960	1959	Avg.	Years of Record **
RIO GRANDE IN COLORADO						
Wolf Creek Pass	4/27	42	20.1	15.9	25.4	24
Upper Rio Grande	4/28	0	0.0	0.0	2.3	24
Santa Maria	4/28	0	0.0	0.0	0.7	21
Pool Table	4/29	0.	0.0	0.0	2.5	11
L. Humphreys	4/29	0	0.0	0.0	0.5	11
Cochetopa Pass	4.28	0	0.0	0.0	2.3	11
Red Mt. Pass	4.27	86	33.5	30.7	29.8	9
Porcupine	4/28	21	10.4	7.0	5.2	9
Wolf Creek Summit	4/27	84	34.5	19.4	31.9	9
Hiway	4/27	76	30.0	17.0	--	4
Pass Creek	4/27	0	0.0	0.0	--	4
ALAMOSA RIVER						
Silver Lakes	4/28	0	0.0	0.0	0.6	23
Summitville	4/27	61	17.9	9.5	21.9	20
CONEJOS RIVER						
River Springs	4/28	0	0.0	0.0	1.0	23
Cumbres Pass	4/27	13	5.3	6.4	13.3	24
Platoro	4/27	24	5.0	5.9	11.9	11
SANGRE DE CRISTO RANGE (COLORADO)						
LaVeta Pass	4/26	0	0.0	0.8	2.8	24
Culebra	4/30	5	0.5	1.0	6.3	20
CHAMA RIVER						
Cumbres Pass	4/27	13	5.3	6.4	13.3	24
PECOS RIVER						
Rio En Medio*	4/29	8	1.9	0.0	--	3
RIO GRANDE IN NEW MEXICO						
Cordova	4/26	4	1.4	--	--	1
Rio En Medio	4/29	8	1.9	0.0	--	3
CANADIAN RIVER						
Cordova	4/26	4	1.4	--	--	1

* On adjacent drainage

** Courses with less than 15 years record in period 1943-57 have all years prior to 1957 averaged.

NS No Survey

(a) Air Observed

Federal - State - Private
COOPERATIVE SNOW SURVEYS

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Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
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"The Conservation of Water begins with the Snow Survey"